Supernatural Agent Cognitions in Dreams

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Abstract

Purpose: To test the hypothesis that supernatural agents (SAs) appear in nightmares and dreams in association with evidence of diminished agency within the dreamer/dream ego.
Methods: Content analyses of 120 nightmares and 71 unpleasant control dream narratives.
Results: We found that SAs overtly occur in about one quarter of unpleasant dreams and about half of nightmares. When SAs appear in a dream or nightmare they are

reliably associated with diminished agency in the dreamer. Diminished agency within the dreamer occurs in over 90% of dreams (whether nightmares or unpleasant dreams) that have overt SAs. In about half of nightmare reports the SA appears suddenly with no clear emergence pattern. In some two thirds of unpleasant dreams, however, the SA emerged from a human character. The SA's gender was indeterminate in most dreams with SAs but the SA communicated with the dreamer in 24% of nightmares and only 13% of unpleasant dreams. In most nightmares, the SA intended to harm the dreamer and in one third of nightmares the dreamer was the victim of physical agression by the SA. SA intentions in unpleasant dreams were more varied and actually benign in 13% of cases.

Conclusion: Supernatural agents reliably appear in nightmares and unpleasant dreams in association with diminished agency in the dreamer. Diminished agency in an individual may facilitate supernatural agent cognitions.

Keywords

religious cognition – supernatural agents – dreams – nightmares – agency

1   Introduction

The practice of religious rituals and belief in supernatural agents (SAs) occurs in virtually all human cultures (Grunebaum, & Caillois, 1966, Bulkeley, 2008). SAs populate all the world's religions and mythologies and take many forms such as monsters, zombies, demons, spirits, angels, gods, fairies, animals/human hybrids and so on.

Why do people postulate SAs? One possibility is that SAs are real and that people straightforwardly perceive and interact with them. Science cannot yet speak to the veridicality of SA cognitions, but it can investigate the cognitive mechanisms involved in SA cognitions. Several investigators have argued, for example, that our conceptions of supernatural agents are constructed out of the inferential machinery that draws on normal folk-psychological processing routines concerning actions performed by ordinary agents like persons and animals (Barrett, 2000; Boyer, 2001; Atran, 2002; Pyysianen, 2009). At the center of most of these proposals concerning SA cognitions is the issue of *agency*. The idea of agency in humans implies the sense that one is the author of one's own action and that one has the power or capacity to cause things to happen and to implement desired or planned actions. Normal agents are organisms whose behaviors are partially caused by or influenced by their mental beliefs

and desires. For purposes of this paper we will define a super-normal or su-pernatural agent as any conceived being (embodied or dis-embodied) that is thought to possess mental agentic powers outside the normal range of human agentic powers or experiences.

In his study of mental representations of SAs Pyysianen (2009) argued that SA-related agency consisted of animacy (liveliness) and mentality (beliefs, desires) (see also Barrett, 2008). Barrett (2000) also pointed to the centrality of agency for SA cognitions when he coined the phrase *hyperactive agent de-tection device* or HADD. The HADD system is thought to be hyper-sensitive to cues suggesting agency or an agent is causing our perceptual responses and so on. Once we decide that an agent is responsible for what we are seeing or experiencing, we then typically attempt to infer its mental states — we use our *Theory of Mind* (ToM) capacity to simulate the beliefs and desires of the putative agent in order to predict its behavior. If we attribute special mental or physical powers to a putative agent in order to account for its behaviors (perhaps we see it pass through walls in order to threaten us so we assume it is disembodied despite its agentic mental powers and so on), we are then more likely to infer it is a supernatural agent. Ascriptions or attributions of agency and mentality to putative agents is therefore fundamental to supernatural agent cognitions. While these proposals concerning the centrality of attribu-tions of agency and mentality to SA cognitions have received wide attention, details on precisely how these cognitive processes yield belief in SAs remain obscure. In particular the issue of why anyone would postulate SAs in the first place remains unclear.

One possibility is that when the sense of agency in an individual is al-tered (e.g. diminished or enhanced), conditions arise for postulation of SAs and ascription of agency to these other beings. For example, in some forms of schizophrenia associated with passivity phenomena (indicating a severely diminsished sense of agency), patients can sometimes experience religious de-lusions (e.g. demonic possession) or religiously-toned auditory illusions and religiously-toned thought insertion phenomena (Mohr and Huguelet, 2004; Jeannerod, 2008). The dramatic loss of agency in the patient prevents him from identifying the mental activity he experiences as his own. He therefore ascribes the ongoing mental activity he experiences to other minds. Since he cannot see these other minds he conceives them as disembodied agents or spirit beings. The patient must also explain why he feels victimized and with-out agency so he ascribes super-human powers (to victimize others) to these spirit beings.

In this paper we build on the work of other investigators who see agency as central to SA cognitions and hypothesize that a decrease in the sense of

individual agency is associated with generation of SAs cognitions. In schizophrenia and similar neuropsychiatric disorders the diminished sense of agency is severe and occurs in the context of disease. Since, however, SA cognitions appear daily in healthy people we wanted to study the relationship between severely diminished agency and the production of SA cognition as it occurs naturally/daily and in the absence of disease. But what naturally occurring cognitive process was associated with severe reductions in agency? *Dreams*. We therefore turned to the study of SA cognitions in dreams. We could also compare the effects of *degree* of loss of agency if we used dreams in our studies as some dream types (e.g. nightmares; see McNamara 2008) are known to exhibit a more severe loss of agency (in the dreamer) than do other dream types. The dreamer is almost invariably a helpless victim of physical agression in nightmares. For example, McNamara et al., 2015 found that physical aggression against the dreamer was present in 68.08% of recurrent nightmares, 53% of regular nightmares, and in only 29.48% of unpleasant dreams. In many instances of physical aggression in nightmares, McNamara et al. found that the source of aggression against the dreamer was a supernatural being.

Taking dreams as our raw material for cognitive analyses of SA cognitions offers several additional advantages for investigations of agency in supernatural agent cognitions as dreams are 1) normal everyday (night) run-of-the-mill cognitive occurrences; and 2) SAs occur regularly in many types of dreams (McNamara, in press; McNamara and Bulkeley, 2015; Bulkeley, 2007; 2008). Nightmares, in particular contain high numbers of SAs (McNamara et al., 2015); 3) dreams are linked with (though not deterministically so) a reliable neurobiologic profile — namely REM sleep; and 4) the sense of agency is altered in dreams (see below). 5) Dreams can be studied profitably with controlled content analyses (Domhoff; 1996); 6) dreams have been empirically linked with facilitation of emotional memory consolidation (e.g. Kramer, 1993; Levin and Nielsen, 2007; Hartmann, 1998; Walker and van der Helm, 2009) — a process that may be important for religious cognition; 7) theory of mind attributions occur frequently in dreams (McNamara et al., 2007); and 8) dreams have long been thought by ethnographers and anthropologists to be a key source for generation of religious ideas including SAs.

Building on the work of the early anthropologists such as Tylor, (1871/1920), a number of more recent ethnograhpers and anthropologists have demonstrated beyond any reasonable doubt that traditional peoples believed SAs appeared regularly in their dreams and communicated with them and that this was the source of their religious ideas and practices (see, e.g., Steward Lincoln, 1935; Eggan, 1949; Devereux, 1951; Kilbourne, 1981; Kracke 1979; Irwin, 1994; Barnouw,

1963; Eggan, 1961; D'Andrade, 1961; Kennedy & Langness, 1981; Tedlock, 1987a and 1992; Mageo, 2006; Lohmann, 2003; Laughlin, 2011).

It is reasonable, therefore, to assess whether dreams are a source of SA cognitions as a consequence of diminished agency. It is very likely the case that dreams represent a natural case wherein the sense of agency is significantly diminished, as the neurobiology of REM sleep is consistent with downregulation of executive control networks in the dreamer. In REM sleep, for example, executive control networks mediated by dorsolateral prefrontal sites are downregulated while amygdalar networks and ventromedial prefrontal cortex are upregulated (Maquet et al., 1996; Braun et al., 1997; Dang-Vu et al., 2007; Hobson et al., 1998; Maquet & Franck, 1997; Nofzinger et al., 1997). All of these neurologic changes are intensified during a nightmare: the downregulation of executive networks is more marked and the activation of the amygdala is more intense. In addition, REM sleep is associated with a generalized atonia or sleep paralysis, which can certainly influence dream content. For example, a very common dream theme involves the dreamer attempting to do something and being prevented from doing so by a host of obstacles, such as being stuck in quicksand or not being able to run normally and so on. These themes are likely linked to the REM atonia and certainly reflect a significant diminishment in the sense of agency within the dreamer.

The main purpose of this paper then was to examine the association, if any, of alterations in agency cognitions within the dreamer and the appearance of SAs in dreams versus nightmares. Because nightmares are known to exhibit more severe reductions in the sense of agency in the dreamer relative to non-nightmare dreams; and because nightmares contain a high number of SAs (see McNamara 2008; McNamara et al., 2015), we collected samples of nightmares with and without SAs and compared them to samples of unpleasant dreams with and without SAs. We hypothesized that SAs would be more likely to appear in nightmares given the more severe loss of agency in nightmares. We also compared the appearance of SAs in dreams depicting the sense of diminished agency (in the dreamer) versus dreams without any evidence of diminished agency (in the dreamer).

2   Methods

Nightmares for this research study were obtained from the internet dream posting website Dreamboard.com. McNamara et al (2015a; 2016) have shown that the dreams and nightmares posted at dreamboard.com do not differ

significantly from dreams that occur spontaneously at home or in the sleep lab. In particular, they very closely match, in terms of dozens of content variables, the narrative content documented in dreams and nightmares collected in normal home and lab contexts.

In 2013, Dreamboard made available to the authors a database of approximately 175,000 dreams posted from 2012 to 2013. These entries consist of a combination of standardized fields and free text to capture individual dream narrative and themes. All dream entries are de-identified to protect the anonymity of the dreamer. We therefore have no information on the individuals who posted these dreams.

To identify nightmares, three judges, all undergraduate students pursuing degrees in psychology or neuroscience and all trained for a half day on dream content scoring procedures, used the following criteria and procedures. They first selected only English language dreams and those labeled by the user as unpleasant. There were approximately 49,000 dreams so labeled. From these unpleasant dreams, they then selected all of those dreams that also were labeled by the dreamer as having an emotion of fear. This narrowed down the pool of potential nightmares to about 10,000. Next, they selected only those that had a narrative dream length greater than 25 words and at least one of the following three criteria:

(1) the fear / terror in the dream(s) was so intense that the person woke up from it and was affected during the awake state, e.g., "My (car) speed launched me off the road and I felt myself falling. It woke me up and my heart was racing," "I wake up not being able to breathe,"; or,

(2) The user actually titled the dream *a nightmare* when describing the narrative; or

(3) the narrative referred explicitly to nightmare content or to content that could awaken the dreamer such as a threat that puts the dreamer's life in danger, e.g., "I was trying to run to my parent's house because there were tornados all around me. My parent's house was the only thing that could save me."

After applying all of these exclusion and inclusion criteria we had 388 nightmares. As a control set of narratives (the dreams contained high negative affect like nightmares but a less severe impairment in agency), we selected a sample of unpleasant dreams drawn from the same pool of Dreamboard dreams from which the nightmares were obtained. We excuded all narratives not in English. We next excluded all the nightmares we had identified as well as any narratives that contained references to nightmares, or to waking up or intense fear or terror. The resultant narratives were often labeled as sad or angry dreams. After

further eliminating narratives that failed word length criteria (narrative must have at least 25 words), we had 285 unpleasant dreams.

To arrive at the final sample for this study we randomly selected 200 narratives from the nightmares and unpleasant dreams samples and scored them for presence of an SA: Only nine of these 200 narratives could not be unequivocally scored for presence or absence of an SA. Sixty-three (63) nightmare narratives clearly had SAs and 57 nightmares did not; 16 unpleasant dreams clearly had SAs and 55 unpleasant dreams did not. In total there were 120 nightmares and 71 unpleasant dreams. They did not differ significantly in length (mean word count for nightmares = 63 (SD = 45); unpleasant dreams = 71 (SD = 37), $t < 1$, n.s.). These 191 narratives were then subjected to more detailed scoring procedures as follows:

We were interested in assessing whether any association could be identified between diminished agentic powers in the dreamer and the appearance of an SA in either nightmares or unpleasant dreams. We were also interested to examine how the SA appeared in the dream and what the dreamer felt or thought about the SA. We therefore used a procedure or scoring rubric we developed called Phenomenological Analysis of Superntural Agent Cognitions (PASAC) to score each narrative for the following categories (see appendix 2 for explanations of PASAC and examples of these scoring categories): Word Count, SA Count, Emergence of the SA (Did it appear out of nowhere or from another dream character, etc.?), Loss/diminished Agency in the dreamer, Fear/Terror in the dreamer, Communication with the SA if any, SA Gender, Nature of SA Intentions toward the dreamer, Effects of SA actions on Dreamer, Disorientation/Liminality/Fear in Dreamer. It should be noted that the following variables were dependent on supernatural agent presence: Emergence, Communication, SA Gender, Intentions toward dreamer, and Effects on Dreamer. For instance, if the scorer recorded 0 for SA count for a specific dream, SA Gender would automatically receive a score of 0 (as opposed to a non-0 score that would code for a particular gender). PASAC has been used to reliably score SA cognitions in religious experiences narratives and in ordinary dreams (McNamara et al 2015b).

Three upper-level undergraduates in psychology and neuroscience were given half-day trainings in using PASAC scoring narratives for these categories. To assess inter-rater reliability for scoring, a sample of 30 dreams (15 nightmares, 15 unpleasant dreams) from the total 191 dreams was randomly selected. Percentage agreement scores were calculated for all categories. All categories evidenced reasonably high percentage agreement scores ranging from 100%

to 56.67%. We then eliminated from further analyses any categories that did not reach at least 70% agreement across all dreams. Thus fear/terror in the dreamer, and disorientation/liminality in the dreamer, were eliminated. The average percentage agreement across all remaining categories was 85%.

3   Results

Sixty-three of 120 nightmares or 52% of nightmares and sixteen of 71 unpleasant dreams or 22% dreams evidenced overt supernatural agent SA representations (z = 4.06, p = .001). A list of these SAs can be found in Appendix 1. It can be seen from the list that there was a total of 46 unique SAs out of 81 total SAs identified across these 191 dreams indicating that 42% of dreams had overt SAs. Approximately 15.2% were spirit beings, 22.8% were human with special powers, 32.9% were humanoid, and 17.7% were difficult to categorize.

Of our total sample of 191 dreams there were 31 non-diminished agency dreams and 160 DA dreams. Of the 31 non-DA dreams 22% (7/31) had SAs while among the DA dreams 45% (72/160) had SAs. Conversely, among the non-DA dreams 77% (24/31) had no SAs and among the DA dreams 55% (88/160) had no SAs (χ^2 = 5.34, p = .02).

Of the 63 nightmares with SA representations 57 (90.5%) had clear evidence of diminished agency in the dreamer and 15 out of the 16 (94%) unpleasant dreams with an SA also evidenced diminished agency in the dreamer χ^2 = 4.95; p = .026). Among nightmares with SAs the SA emerged from a human character in 22% of nightmares, from an animal character in 12%, from the dreamer in 6%; and from a substance of some kind in 6% of nightmares. In 52% of nightmare reports no clear emergence pattern was identifiable. The SA just suddenly appeared. Not so with unpleasant dreams with SAs. Some 62.5% of these evidenced SA emergence from a human character, none emerged from an animal character, 6% emerged from the dreamer, and 6% from a substance. Twenty-five percent emerged suddenly with no clear origin.

The gender of the SA was indeterminate in 87% of nightmares with SA and 31% of unpleasant dreams with SAs. When gender could be determined, it was more often female in nightmares (5 females vs 3 males) and male in unpleasant dreams (4 females vs 7 males).

In 24% of nightmares there was evidence that the dreamer communicated with the SA. For example, "I was told by the unseen perpetrator that it would slowly kill me." Only 13% of unpleasant dreams exhibited evidence of communication between dreamer and the SA.

Intentions/actions of the SA toward the dreamer were harmful in 63.5% of nightmares and indeterminate in 36.5% of nightmares. Intentions toward the dreamer in unpleasant dreams were harmful in 50% of dreams; benign in 12.5% and indeterminate in 37.5% (χ^2 = 8.26, p = .016).

The dreamer was the victim of aggression by the SA in 21 or 33% of nightmares with SAs and in only 1 (6.3%) of unpleasant dreams with SAs.

4   Discussion

We found that SAs overtly occur in about one quarter of unpleasant dreams and about half of nightmares. When SAs appear in a dream they are reliably associated with diminished agency in the dreamer. Diminished agency within the dreamer occured in over 90% of dreams (whether nightmares or unpleasant dreams) that have overt SAs. In about half of nightmare reports no clear emergence pattern of the SA was identifiable. The SA just suddenly appeared. In some two thirds of unpleasant dreams SA emergence was from a human character. The SA's gender was indeterminate in most nightmares with SAs but the SAs were more likely to communicate with the dreamer in a nightmare than in an unpleasant dream. In nightmares SA intentions were almost always intentions to harm the dreamer, and in one third of nightmares the dreamer was the victim of physical agression by the SA. In unpleasant dreams SA intentions toward the dreamer were occassionally benign.

These findings support the hypothesis that SA cognitions are associated with a sense of diminished agency in the individual. The fact that SAs occurred more frequently in association with diminished agency in nightmares suggests that degree of agency impairment is important for apperance of an SA cognition. Overt SAs were more likely to appear in nightmares/dreams that evidenced severe reductions in agency in the dreamer. Our hypothesis that the appearance of SAs would be associated with both a reduction in dreamer agency along with attributions of special agentic powers to other dream characters was only partially supported by our findings. About half of SAs emerged from other dream characters. The other half appeared suddenly out of nowhere with special powers fully realized and operational. Nevertheless, the fact that some attributional process was occuring in relation to SA appearance was supported by the finding that the dreamer often reported that the SA harbored special, mostly harmful, intentions toward the dreamer. In a substantial proportion of nightmares (24%) the SA communicated with the dreamer and/ in the case of nightmares the SA physically assaulted or attempted to

harm the dreamer. In short, the dreamer experienced diminished agency and then cognized that some other character had harmful intentions toward the dreamer and actually acted against the dreamer. These cognitions suggest that the dreamer was imputing or ascribing or attributing special powers to harm the dreamer to the SA.

When an individual experiences diminished agency (e.g. passivity phenomena in schizophrenia; daydreams, transient altered states of consciousness etc), he nevertheless continues to think and experience emotions and other mental activity. He therefore needs to find a source for all this mental activity so he ascribes it (or agency more generally) to some other entity. The other entity has to be an agent becuase it has to have mental activity as that is what the individual needs to explain. In dreams REM biology induces the dimunition in agency. This diminution in agency due to REM biology is more severe in nightmares. It is not surprising therefore that SAs would appear more often in nightmares. Despite this loss of agency mental activity continues, and so the dreamer needs to find its source. He attributes the mental activity to some other entity and in the case of dreams the candidates are other dream characters. Because the loss of agency in dreams can be extreme due to REM biology, especially in nightmares, the attribution of mental powers to other characters can also be extreme and thus you get supernatural agents. Dreams therefore appear to be a very fertile source for generation of SA cognitions.

Interestingly some models of religious ritual describe an alteration in the sense of agency as integral to the ritual process. Liénard and Boyer (2006; p. 815), for example, proposed that ritualized behaviors are characterized by "compulsion (one must perform the particular sequence), rigidity (it must be performed the right way), redundancy (the same actions are often repeated inside the ritual) and goal demotion (the actions are divorced from their usual goals)." All of these conditions arguably involve a sense of diminished agency in the individual performing these rituals. Humphrey and Laidlaw (1994) pointed out that instead of performing one's own intended actions during a ritual, one performs actions stipulated by others who devised the actions long ago-sometimes centuries ago. One's own agency is set aside in favor of acting out the agentic purposes or intentions of others who lived in some cases centuries ago. Rappaport (1999) defined ritual as "acts and utterances not encoded by the performers themselves." Religious rituals therefore very likely involve a sense of diminished agency in the individual. These considerations on ritual cognition support the claim here that postulation of religious SAs likely involves a similar process of agency impairment. The one place where the sense of agency is routinely impaired is dreaming.

Having discussed the major finding that the appearance of SAs is reliably associated with diminished agency in dreams, we turn now to other key findings.

Some 62.5% of cases of SA emergence in unpleasant dreams and 22% in nightmares came from a human character. That is, a normal human character in a dream turned into a SA as the dream progressed. We suggest that these character transformations in a dream allow us to see the birth of an SA as it takes place in a normal cognitive process-namely dreaming. The essence of the process lies in bodily changes in the character (transformation from a human to a vampire etc.) and then the ascription of extraordinary mental abilities to the new character (the vampire single-mindedly wants to possess the mind of the dreamer and drink her blood). Characters, including the dreamer, can be transformed into other characters in the dream. These metamorphoses very likely contribute to the construction of elements of SAs (like attribution of mental states to the SA) in the dream. Schweikert and Xi (2011) studied dream reports from 21 dreamers in which a metamorphosis of a person-like entity or animal occurred and noted when mind-like attributes or inner states were attributed to them (Theory of Mind) by the dreamer. Interestingly, a metamorphosis of a person-like entity or animal did not lead to an increase in the amount of Theory of Mind attributions. SAs, however, may be an exception to this rule. In the case of SAs, when a human turns into an SA, the dreamer reports the SA has new and special mental capacities. This pattern is broadly consistent with Schweikert and Xi's proposal that a character line starts when a character enters a dream and then mental capacities are assigned along that character line depending on the plot or story line of the dream. Mental properties and Theory of Mind attributions tend to be preserved along the line, regardless of whether metamorphoses occur on it. The capacity of dreams to spontaneously create these character lines makes it a potent source for creation of SAs as the character lines attract or require Theory of Mind attributions. We know that there is an abundance of Theory of Mind attributions occurring in dreams (McNamara, 2004; McNamara, et al., 2007). When these ToM attributions involve extraordinary mental capacities we get SAs.

It is interesting that the SAs are more likely to communicate with the dreamer in nightmares than in unpleasant dreams. We do not have any convincing explanations of this finding. One possibility is that emotions are more intense in nightmares than in unpleasant dreams and this intensity may further the sense of loss of agency thus increasing the need to ascribe or simulate mental states in other dream characters.

It is unclear why the gender of SAs were most often indeterminate. While many SAs in myth and folklore have clearly defined gender roles, there are

also many with indeterminate genders such as ghosts, fairies, goblins, trolls and so on. Animal deities are often not given gendered identies either. There was also some indication of a trend for SA gender being more often female in nightmares and male in unpleasant dreams. An established finding in dream content research is that the appearance of male strangers in dreams are typcially associated with the occurrence of some form of physical agression in the dream usually directed at the dreamer (Domhoff, 1996), so we would have expected that the threatening SA in nightmares woulld more often be male — not female.

How might SA cognitions in dreams inform daytime religious cognition? We have argued that REM dreams (including nightmares) are characterized by two key cognitive processes that lend themselves to generation of supernatural agent cognitions: a) a transient loss of agency in the dreamer with b) subsequent mis — or over-attribution of agentic abilities to other dream characters. We see these processes as part and parcel of the decentering" process that McNamara (2009) suggested was key to religious cognition in general. REM sleep dreaming may be core to that decentering process. The current Self is decntered or taken off line while a search is triggered for a new Self structure. That decentering process is a liminal state and occurs naturally within REM dreams. When dream characters are invested with supernormal abilities (after the dreamer is decentered or divested of all agency) conditions for a relation of fear or dependency between the dreamer and the other supernormal dream characters are produced. The asymmetric dependency relation between the dreamer and the SA is paradigmatic for the relationship between people and their deities during waking life. These dream-rooted SA cognitions get transferred into waking cognitions via multiple routes, e.g., via emotional memory consolidation processes, via the intrusion of REM physiologic processes into waking life as in daydreams or reveries, during dream sharing with others, when dream moods carry over into waking life, etc.

Is it possible that SAs cognitions are preferentially transferred into waking consciousness over other types of mental content, thus accounting for the ubiquity of religious ideas in most populations? While it would be fascinating to find a selective effect on information transfer from dreams into waking cognitions no such effect has yet been found in the dream literature. Our hypothesis does not require that *only* SAs get transferred into waking consciousness. Strictly speaking all that is required for dream SAs to inform religious cognition in waking life might be that some of the images of the actual SAs from dreams enter waking cognitions long enough to bias some waking cognitions toward temporary acceptance of the supernatural until the next night comes and the next batch of dreams are experienced and so on. In point of

fact, however, all kinds of dream images find their way into waking cognition including SA cognitions/images. That is partially because there are multiple routes (mentioned above) from dreams to waking consciousness including persisting dream affect, REM intrusion states, waking reverie, daydreams etc. We briefly discuss only one of these possibilities: the transfer of SA cognitions into waking life via emotional memory consolidation processes.

There is increasing evidence that REM sleep and dreams are critically involved in consolidation of emotional memories (see Walker, 2009; Walker and van der Helm, 2009 for review). In a typical study of the role of sleep in emotional memory consolidation Wagner et al. (2001) found that 3 hours of late night, REM-rich, dream sleep (but not 3 hours of early night slow-wave rich sleep or 3 hours of wakefulness) facilitated memory for narratives with intensely negative emotional content. More recently, Nishida et al, (2009) reported similar effects of REM on encoding of emotional information during REM. Dreaming is especially ideal for emotional memory consolidation because dream images facilitate both decontextualization and re-contextualization of memories or autobiographical episodes so that they can be integrated into long term memory (Levin and Nielsen, 2007). Dream images provide an ever changing sequence of contexts that can be paired with the intense affect in dreams such as fear-related elements (e.g. a danger of threat or trauma) thus creating new images that can be easily integrated into memory. When affect loads are intense or fearful the fear can be reduced by decontextualizing the memory and thus promoting integration. Bad or unpleasant dreams are thought to be examples of successful dreaming wherein fear levels associated with the original fear memory are reduced or extinguished thus allowing the information associated with the emotional event to be integrated into long term memory.

The appearance of supernatural agents in dreams suggests that they too may play a role in re-contextualization of emotional events. If an individual, for example, in ancient China experiences an emotional event in his family life and then encounters one of his revered ancestors as a spirit being in his dreams, that ancestral spirit may re-contextualize the family emotional event infusing it with special and multiple meanings thus facilitating its integration into long term memory. When the man awakes and then again interacts with his family later that day the emotion will not be as raw and he will recall the ancestor spirit who helped him resolve the emotional crisis during his dream. We realize this is all very speculative and we propose the scenario as just one possible route though which SA cognitions in dreams can influence daytime religious cognition.

Could dreaming promote one type of SA concept at a higher rate than others (e.g., more likely to prompt beliefs in ancestors than high gods)? We note that differing dream types certainly do produce differing SA types. For example, so called "Big dreams" tend to produce encounters with SAs from the dreamer's religious tradition while "visitation" dreams produce encounters with direct ancestors or dead relatives/loved ones (McNamara and Bulkeley, 2015). Nightmares and sleep paralysis dreams produce encounters with demonic SAs and mundane anxiety dreams tend to produce encounters with unusual threatening SAs. We provided in the appendix a list of the types of SAs produced in our sample of dreams. It appears from this small sample that dreams are capable of producing all kinds of SAs, but the issue of whether dreams tend to produce one kind of SA over others remains an open empirical question.

In conclusion, we presented evidence that SA cognitions are frequent in dreams and nightmares and that they are reliably associated with diminished agency in the dreamer. We suggest that this mechanism, diminished agency in the individual, may be crucial for religious cognition and that dreams can be profitably studied as a potent source for religious cognitions more generally.

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Appendix 1: List of SAs in Dream Corpus

1.   Human body flying in a paranormal way
2.   Zombies
3.   Evil man with the ability to capture a horse into his mind
4.   Evil entity with the ability to move people
5.   A beast
6.   Ghosts
7.   Unseen perpetrator
8.   Roadkill that morphed into snakes with the ability to attack humans
9.   Evil human that turns other humans evil, too
10. Little creature that chases people
11. Moonlight that turns people toxic
12. Vampires
13. Angels
14. Spirits
15. Crocodiles that chase humans
16. Possessed girl
17. Japanese people who could send others into the future

18. Mermaids
19. Possessed cat
20. Demons
21. Dead people
22. A girl hungry for flesh
23. Hog that kills people
24. Hamster that eats humans
25. Energy that controls people
26. Invisible being that chokes people
27. Faceless people
28. Blurry spot that can lift objects and speak to humans
29. Box that could grab humans and put them inside the box
30. Living produce
31. Wolverine beast
32. Mean animals that antagonize humans
33. Mutated baby
34. Angel wings
35. Transformers
36. Humans who could fight with magic
37. A woman who could switch bodies with someone else
38. Human that could eat kittens
39. A man with super strength
40. Water god
41. A girl whose head stared sparking and oiling
42. A mysterious voice
43. Dead man who came back to life
44. People who could brainwash others
45. Human with wings
46. Stormcloaks

Appendix 2

PASAC (**P**henomenological **A**nalysis of **S**uperntural **A**gent **C**ognitions) scoring procedures

We want to:

– identify how many supernatural agents (SAs) occur in dreams/nightmares
– whether the appearance of the SA is associated with diminished agency in the dreamer
– how SAs emerge in a dream/nightmares

– what characteristics (gender, emotion level, intentionality etc) are displayed by the SA

What is an SA? An SA is any being that appears to have human-like mental / intentional states and that possess larger than human powers. They are monsters, zombies, demons, spirits, angels, God, gods, fairies, aliens, animals that display some human characteristics and unusual abilities for animals, and so on.

Scoring procedures:

First count and record number of words in the narrative

Then identify, count and record number of SAs in the dream

is there evidence of diminished agency/lack of power or abilities in dreamer? 1=yes 0=no

Then identify whether another character appears or exists who has extra agency, powers or abilities 1=yes 0=no

If yes call that other character an SA for now and score following:

how the SA appeared or emerged:

From a human unfamiliar or poorly-defined character in the dream

From animal character

From dreamer him/her self

From some substance (like earth, water, ooze, ether, etc)

Other

What happened to the dreamer when the SA appeared?

loss of agency in dreamer (e.g. sense of weakness, helplessness, disorientation, lostness; indecision, etc) 1= yes there was loss of agency; 2= no discernible loss of agency; 3=unknown

Was fear, terror or anxiousness present? 1= yes 2= no; 3=unknown

did dreamer communicate with SA in any way (talk, sound, touch, mindreading, vision etc) 1= yes; 2= no 3 = unknown

Then identify important characteristics of the SA

its special powers (just write one phrase … it can kill with a stare, it can inspire with a smile; it can see into a soul, it can read dreamer's mind, it can devour a soul etc)

its gender 1=female; 2= male; 3= indeterminate

its intentions….

intentions were 1) harmful, evil, malevolent; 2) benign good etc 3 indeterminate

its apparent effects on the dreamer

0=no discernible effects of character's special powers on dreamer

1=dreamer notices special character

2=dreamer terrified of special character

3=victim of aggression from special character

4=dreamer becomes aggressor

Example coding:

1010 (07/16/88)

The Drapes **Nightmare**. Ellie kept bothering me. She came into my house and wasn't thinking, just kept being in the way or annoying me. I tried to get her to leave me alone. I wanted to go to bed. I got into a small, thin brass bed but the covers and pillows wouldn't stay put. It was uncomfortable. I was very angry. I pushed and shoved to throw her out and she'd keep popping back in. I looked out the window and Arvonne was dressing up to go out. She was putting on a blond wig. It was a brassy, bright bee hive blonde hairdo. I was glad she was getting out of my way too. Now I'm in my room and sort of on a boat in a closed up space. A horrible dog/boy creature is attacking me and it bites savagely. A man behind me says, "I'll help. Let me do that." I say nothing but continue to take the attack. It is very painful; constant and scary. Ellie is also attacking. I throw it away and it lunges back at me. I scream in agony and frustration. The man can't take it anymore. He grabs the horrible attacking thing and throws it into a garbage disposal. I scream, "No!" and hear the grinding up of its body and can't bear the thought of its pain or death. I don't want to cause anyone else pain. Then I look again in renewed horror because the thing is now four times larger, an ugly large boy, and he's crawling out of the garbage disposal to get me even worse. I run to escape. I go into a room, like a living room or a captain's bedroom of a boat. I go to the tall windows and try to climb up, pulling myself hand over hand up the drapes. Each drape I try to climb up falls and is replaced by another drape. This happens over and over and over. I know now I'm trapped. I panic, sobbing. I pick up objects off the dresser to heave it at the window to break it open and it just bounces off like it was Mylar plastic windows. Nothing I do helps. I am condemned to this hell for eternity. (378 words)

Scoring results for this dream:

First count and record number of words in the narrative

378 words

Then identify, count and record number of SAs in the dream

Two *SAs dog/boy and ugly large boy*

Then identify how the SA appeared or emerged

From a human character in the dream

From animal character

From dreamer him/her self

From some substance (like earth, water, ooze, ether, etc)

Other

Have to choose other for dog/boy as it appeared after dreamer was in an enclosed space

Ugly large boy appeared from garbage disposal so have to choose other again

What happened to the dreamer when the SA appeared?

a) loss of agency in dreamer (e.g. sense of weakness, helplessness, disorientation, lost-ness; indecision, etc) 1= yes there was loss of agency; 2= no discernible loss of agency; 3=unknown

after dog/boy appeared … there was a definite loss of agency in the dreamer as dreamer needed help from bystander man

after large boy there is loss of agency because dreamer tries to break open window but fails to do so

Was fear, terror or anxiousness present? 1= yes 2= no; 3=unknown

yes in both cases dreamer explicitly says she feels terror

did dreamer communicate with SA in any way (talk, sound, touch, mindreading, vision etc) 1= yes; 2= no 3 = unknown

no in both cases

Then identify important characteristics of the SA

a) its special powers (just write one phrase … it can kill with a stare, it can inspire with a smile; it can see into a soul, it can read dreamer's mind, it can devour a soul etc)

dog/boy can tear at flesh, bite, be ferocious etc; ugly large boy same

its gender 1=female; 2= male; 3= indeterminate

male in both cases

its intentions….

intentions were 1) harmful, evil, malevolent; 2) benign good etc 3 indeterminate

intentions were to harm dreamer and other dream characters

A second example:

☑ #2973 (06/05/96)

I am a woman who is being terrorized by a man who takes a medicine and is invisible. He grabs the steering wheel of the car I'm driving and tries to crash us and so on. I flee. Now I am a man and the same *invisible man* is after me. It is a life and death situation. I suspect my psychiatrist. I go into his office to see if I can find evidence. He comes in and I hide in his closet. a roomy coat closet. He comes in and I hide behind coats. He says to me, "I can smell you. I know you're here." He tries to feel me but barely misses me. He leaves. Now I've driven up to my own cabin or house. I sing opera and a rock group wants me to sing with their band, blending the two forms of music. The invisible man comes. There are lots of people in the room and I fire my pistol into the invisible man many times. Everyone thinks I've gone crazy and I ask them to leave. The suppos-edly dead, invisible man lays under my pool table. I feel for a pulse; he is still alive and I shoot many more bullets into him. Finally he is dead. Then a second invisible man is after me. I fight him too. It is terrorizing a **nightmare**. (230 words)

Scoring results:

First count and record number of words in the narrative

230 words

Then identify, count and record number of SAs in the dream

2 SAs invisible man and second invisible man

Then identify how the SA appeared or emerged

First invisible man ... A normal man takes a medicine and becomes invisible (*so score from a human character*)

Second invisible man emerges from a dead invisible man (*score other*)

From a human character in the dream

From animal character

From dreamer him/her self

From some substance (like earth, water, ooze, ether, etc)

Other

What happened to the dreamer when the SA appeared?

a) loss of agency in dreamer (e.g. sense of weakness, helplessness, disorientation, lostness; indecision, etc) 1= yes there was loss of agency; 2= no discernible loss of agency; 3=unknown

definite loss of agency in dreamer ass dreamer says she can't drive car anymore ... also she hides in closet but SA can still "smell her"

Was fear, terror or anxiousness present? 1= yes 2= no; 3=unknown

1 yes

did dreamer communicate with SA in any way (talk, sound, touch, mindreading, vision etc) 1= yes; 2= no 3 = unknown

no

Then identify important characteristics of the SA

its special powers (just write one phrase ... it can kill with a stare, it can inspire with a smile; it can see into a soul, it can read dreamer's mind, it can devour a soul etc)

special powers of invisibility and smell

its gender 1=female; 2= male; 3= indeterminate

male

its intentions.... intentions were 1) harmful, evil, malevolent; 2) benign good etc 3 indeterminate

clear malevolent intentions toward the dreamer